

(19) World Intellectual Property Organization
International Bureau(43) International Publication Date
18 April 2002 (18.04.2002)

PCT

(10) International Publication Number
WO 02/30213 A1(51) International Patent Classification: A23G 3/00,
9/02, 9/00, 3/20

(21) International Application Number: PCT/EP01/11369

(22) International Filing Date: 1 October 2001 (01.10.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0024810.4 10 October 2000 (10.10.2000) GB(71) Applicant (for all designated States except US): SOCI-
ETE DES PRODUITS NESTLE S.A. [CH/CH]; P.O. Box
353, CH-1800 Vevey (CH).

(72) Inventors; and

(75) Inventors/Applicants (for US only): JONES, Adrienne,
Sarah [GB/GB]; Garda House - Main Street, Sutton on
the Forest, York YO61 1DP (GB). ONG, Mei, Horng
[MY/GB]; 8 Bowling Green Croft, Haxby Road, York
YO31 8FY (GB). SOLDANI, Cristiana [IT/IT]; Viale F.
Testi, 210, I-20126 Milano (IT).(74) Agent: PATE, George, Frederick; 55, avenue Nestlé,
CH-1800 Vevey (CH).(81) Designated States (national): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
MX, MY, NZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI,
SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU,
ZA, ZW.(84) Designated States (regional): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian
patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European
patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE,IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF,
CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD,
TG).

Declarations under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

— as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

— of inventorship (Rule 4.17(iv)) for US only

Published:

— with international search report
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: ENCASED FOOD PRODUCT WITH CONTRASTING COMPONENTS

(57) Abstract: A food product comprising a gelatin-free water-based hydrocolloid casing that can withstand changes in temperature enclosing a solid, liquid, soft or particulate centre and a process for the production of a food product comprising a gelatin-free water-based hydrocolloid casing enclosing a hard, liquid, soft or powder centre which comprises partially setting a liquid hydrocolloid mass and injecting with a hard, liquid, soft or -particulate centre and finally completing the setting of the hydrocolloid mass.

ENCASED FOOD PRODUCT WITH CONTRASTING COMPONENTS

FIELD OF THE INVENTION

- 5 The present invention relates to an encapsulated food product and more particularly to a food product comprising a gelatin-free water-based hydrocolloid casing surrounding a liquid, soft, hard or particulate centre.

BACKGROUND OF THE INVENTION

- 10 EP-A- 64155 discloses a bite-sized edible confection or cocktail snack comprising a fat-based waterproof capsule surrounding a centre filling of high liquid content.
- 15 WO 97/35537 discloses a method for making capsules for pharmaceutical, cosmetic and dietary supplements with a very thin film/coating or layer of a material such as polyvinyl alcohol, alginate, hydroxypropyl methyl cellulose or polyethylene oxide made by a method based on a roller process. It is stated that polyvinyl alcohol film is available in thicknesses ranging between 20 and 1000
- 20 microns and that plasticised polyvinyl alcohol film having a thickness of 80 microns results in good quality capsules suitable for cosmetic use. There is no disclosure of the use of such capsules for use in foodstuffs.
- 25 Fat-based capsules have a tendency to crack in changing temperatures especially in tropical climates or where temperatures can reach 40°C or above.
- Neither of these patents disclose a food product having a casing, i.e. having a thickness of more than 0.1mm, aqueous-based, and able to withstand changes in temperature without cracking nor a product exhibiting a contrasting appearance
- 30 between the casing and the centre.
- We have developed a food product comprising a gelatin-free water-based hydrocolloid casing enclosing a solid, liquid, soft or particulate centre which is capable of exhibiting a contrasting appearance between the casing and the centre.
- 35 The casing may be substantially transparent or opaque and, in particular, when the casing is transparent, the contents of the centre may be clearly visible.

SUMMARY OF THE INVENTION

5 According to the present invention there is provided a food product comprising a gelatin-free water-based hydrocolloid casing enclosing a solid, liquid, soft or particulate centre.

DETAILED DESCRIPTION OF THE INVENTION

10 The casing may be substantially transparent or opaque.

The casing may have a thickness of between 0.1mm and 10mm, preferably from 1 to 7.5mm, e.g. from 2 to 5mm.

15 The hydrocolloid used in the casing may be carrageenan, alginate, agarose, gellan gum, pectin, or a cellulose derivative. The casing may be aerated to create opaqueness.

20 The food product of the invention is capable of exhibiting a contrasting appearance between the casing and the centre. The contrast may reside in the texture, colour, flavour or acidity of the centre compared with the casing.

25 Some liquid-filled gummy products are already on the market based on gelatin. However, food-grade gelatin is obtained from bovine or porcine raw materials and the use of gelatin is undesirable for the vegetarian population, as well as for certain ethnic groups who have concerns about the nature of meat used in certain food products and/or who observe certain dietary constraints concerning the consumption of meat and dairy products. We are not aware of any liquid-filled confections that are gelatin-free.

30 The amount of hydrocolloid in the casing may vary from 0.5 to 80% by weight depending on the thickness of the casing, e.g. for casings having a thickness of from 0.1 – 2mm, the amount of hydrocolloid in the casing may be from 5-80% by weight the proportion of hydrocolloid preferably being higher the thinner the casing, and for casings having a thickness of from 2-10mm, the amount of
35 hydrocolloid in the casing may be from 0.5 to 5% by weight and preferably from 1

to 4% by weight based on the weight of the casing. The other main ingredients are water and sweetener. The water may be in an amount of from 3% to 50%, preferably from 7.5 to 40% and especially 10 to 20% by weight based on the weight of the casing. If desired, sugar, sugar syrup or sugar substitutes such as maltitol, lactitol, mannitol, xylitol, sorbitol, or artificial sweeteners may be present in the casing, e.g. the casing may, if desired, be sugar-free. Small amounts of acid, buffer or colourant may also be present in the casing

The final solids content of the casing may be from 50 to 97%, preferably from 60 to 95% and especially from 75- 85%.

The texture of the casing can vary from a plastic-like film to a water jelly to a fruit gum to a chew type texture (elastic to non-elastic).

The liquid or soft centre may contain water and sweetener, e.g. sugar, sugar syrup or sugar substitutes such as maltitol, lactitol, mannitol, xylitol, sorbitol, or artificial sweeteners, optionally together with oil/fat and other ingredients such as colour, flavour, acid or functional ingredients such as minerals, vitamins or herbs. The liquid centre can have a viscosity varying from that of water to the fluidity of glucose syrup at 25°C. (The viscosity of water @25°C. is 0.89cP and that of glucose syrup 42DE @25°C. is 159000cP).

The soft centre can vary from a paste, e.g. a chocolate, fat, or fruit paste, to a jelly to a chew texture. The solid centre may be, for instance, nut pieces, chocolate, fruit pieces, cheese, or hard-boiled pieces.

The particulate centre may be a powder, granular or an agglomerate having a particle size of from 25 to 2000 microns and may contain, for instance, sherbert, popping candy, sugar or sugar-substitutes such as maltitol, lactitol, mannitol, xylitol, sorbitol, or artificial sweeteners, and other functional ingredients such as minerals, vitamins or herbal extracts.

The solids content of the liquid or soft centre may be from 50 to 90%, preferably from 60 to 85% and especially from 75-80%. The solids content of the hard centre may vary from about 50 to 99% e.g. for hard cheese (eg Cheddar) it may be from 60-65%, and for hard-boiled pieces it may be from 95-99%.

The weight ratio of the casing to the centre may range from 90:10 to 10:90, for example from 75:25 to 25:75.

5 The product may be used in hot, ambient, chilled and frozen applications, e.g. the product may be dropped in hot liquids at, for example, 80° to 100°C to make hot drinks.

10 The product of the present invention may be a refreshing, clean eating sugar and/or sugar-free gelatin-free food product that is texturally interesting and visually attractive.

The product of the present invention may be a food product containing a single or multi-component centre with or without pieces. It may have a wide variety of shapes, e.g. spheres, hemispheres, cubes, cuboids, lentils, teardrops, pyramids, or cylinders.

15 The product of the present invention may conveniently have a diameter from 4mm to 50 mm, preferably from 8mm to 40mm and more preferably from 10 mm to 25mm.

20 The product of the present invention may deliver a centre of contrasting texture, flavour, colour, acidity to the coating and can offer significant differentiation to existing products. The product may also deliver active or functional ingredients such as minerals, vitamins or herbal extracts, etc.

procede
30 { The present invention also provides a process for the production of a food product comprising a gelatin-free water-based hydrocolloid -casing enclosing a hard, liquid, soft or particulate centre which comprises partially setting a liquid hydrocolloid mass to form the casing, e.g. in two halves or as a balloon and filled with a hard, liquid, soft or powder centre, and injecting with a hard, liquid, soft or powder centre and finally completing the setting of the hydrocolloid mass.

35 The injection of the liquid or soft centre may be carried out by means of a syringe or by one-shot depositing such as generally described in US Patent No. 1,711,750.

Most hydrocolloid systems set fairly quickly usually at about 40° to 90°C when there is difference in temperature gradient, i.e. the gel sets quickly when in contact with something lower in temperature than itself. The bigger the temperature difference the quicker the setting. One exception is alginate which sets on contact with calcium ions.

Therefore, for water-based hydrocolloid casings excepting alginates enclosing a liquid or soft centre, the food product may be prepared by depositing a liquid hydrocolloid mass at a temperature above its setting temperature, e.g. 40° – 90°C, in a mould which is at a lower temperature than the liquid hydrocolloid mass, and injecting with a liquid or soft centre at a temperature lower than the temperature of the hydrocolloid mass while the hydrocolloid mass is still soft until it sets. Preferably, the hydrocolloid mass is cooled to speed up the setting of the gel and to ensure the centre stays central.

The injected centre at a lower temperature than the liquid hydrocolloid mass is conveniently at a temperature from 5°C to 50°C, preferably from 8°C to 30°C, and especially from 10°C to 15°C.

The injected centre at a lower temperature than the liquid hydrocolloid mass causes the hydrocolloid mass to set immediately on contact, thereby encasing the centre within the gel.

If desired, the liquid hydrocolloid may be deposited into a bubble pack lining the mould or into pots which form the packaging, for instance, by one-shot depositing.

For water-based hydrocolloid casings excepting alginates enclosing a hard or particulate centre, the food product may be prepared by lining a mould with a liquid hydrocolloid mass at a temperature above its setting temperature, e.g. from 40°C to 100 °C, the mould being at a lower temperature than the liquid hydrocolloid mass, to form a shell open at one end, inserting the hard or particulate centre into the shell, and backing off with a layer of hydrocolloid casing.

For a water-based alginate casing, the food product may be prepared by depositing a liquid alginate mass in an aqueous medium containing preferably calcium ions

to form a semi-set pliable casing instantaneously, surrounding the liquid alginate mass, injecting with a liquid or soft centre and finally completing the setting of the alginate mass. The setting will occur with time but, if desired, cooling will help speed up the setting, e.g. in an aqueous medium around 10°C-20°C. For achieving the desired shape, the liquid alginate mass is deposited into a mould submerged in the calcium bath, the mould having fine holes in the base which allows the aqueous medium to circulate around the mass thereby causing it to set.

The aqueous medium containing calcium ions may contain from 0.1% to 5% preferably from 0.5 to 2%, depending on the solids content of the hydrocolloid mass of an edible calcium salt, e.g. calcium acetate, calcium citrate, calcium tartrate, calcium lactate, calcium propionate or calcium carbonate but preferably calcium chloride.

The thickness of the casing depends on the length of time the alginate gel is in contact with the calcium ions.

In a further embodiment, the present invention provides a food product comprising two or more gelatin-free water-based hydrocolloid casings connected together each casing enclosing a solid, liquid, soft or particulate centre.

The casings may be substantially transparent or opaque.

The centres within the casings may be the same or different. When the centres are different, they may comprise materials which are reactive with one another, the reaction taking place when the casings are destroyed on consumption. For example, the reaction may include the release of a gas such as carbon dioxide, e.g. where one centre comprises an alkali such as sodium bicarbonate and another centre comprises an acid, e.g. a fruit acid such as citric acid. Advantageously, in addition to the reactive materials, at least one of the centres may comprise other materials such as flavours, e.g. champagne concentrate. The two centres may be made, for instance, by injecting with two needles. The food product comprising two or more gelatin-free water-based hydrocolloid casings connected together may be made by sticking two or more casings together when they are wet.

The product of the invention is a sugar/sugar-free/functional food product that is gelatin-free, visually interesting and extremely striking, combining a textural difference and an immediate flavour impact, and which delivers clear differentiation from existing products on the market.

Compared with the fat-based capsule described in EP-A-64155, the product of the invention has a different texture ranging from plastic to elastic to non-elastic and the absence of fat (only if the centre doesn't contain fat or oil) makes the product cleaner and more refreshing to eat.

EXAMPLES

The following Examples further illustrate the present invention. Parts and percentages are given by weight.

Example 1

A Carrageenan Gum mass having a total solids content of 77% and a pH of 3.8 to 4.0 for the gel casing is prepared by mixing the ingredients of the following recipe:

Gum Recipe	%
Sugar syrup	57
Sugar	20
Water	19
Carrageenan	2.4
Acid	1.6
Buffer	0.8

The gum mass at a temperature of 90°C is deposited into a mould at 25°C and is injected by a syringe with a liquid centre at 15°C while still soft. The liquid centre is prepared by mixing the ingredients of the following formulation:

Liquid Centre	%
Sugar syrup	99.5
Colour	0.004

Flavour 0.4

5 This results in a visually extremely striking product. One processing option for these products might be to mould directly into bubble packs or deposit into pots or moulds by one-shot depositing.

Example 2

10 An alginate gum mass having a total solids content of 75% and a pH of 3.8 – 4.0 for the gel casing is prepared by mixing the ingredients of the following recipe:

	%
Sugar	48
Sugar syrup	20
15 Alginate	1.5
Water	30
Glyceryl monostearate	0.2
Trisodium orthophosphate	0.3
20 Flavour	0.04

The Alginate mass at 85°C is deposited into a calcium bath containing 99.5% water and 0.5% calcium lactate at 20°C and allowed to set. A semi-set casing forms after about 5 minutes leaving the centre of the product liquid.

25 The liquid centre at a temperature of 15°C is injected with a syringe through the semi-set casing. The casing sets fully over a period of time which may vary from 5 minutes to 120 minutes. This results in a soft product with a liquid centre.

30 The liquid centre is prepared by mixing the ingredients of the following formulation:

Liquid Centre	%
Sugar syrup	99.5
35 Colour	0.004
Flavour	0.4

CLAIMS

1. A food product comprising a gelatin-free water-based hydrocolloid casing enclosing a solid, liquid, soft or particulate centre.
2. A food product according to claim 1 wherein the hydrocolloid used in the casing is carrageenan, alginate, agarose, gellan gum, pectin or a cellulose derivative.
3. A food product according to claim 1 wherein the amount of hydrocolloid in the casing is from 0.5 to 80% by weight based on the weight of the casing.
4. A food product according to claim 1 wherein the amount of water in the casing is from 3 to 50% by weight based on the weight of the casing.
5. A food product according to claim 1 wherein a sweetener is present in the casing.
6. A food product according to claim 1 wherein the liquid or soft centre contains water and sweetener together with a colour, flavour, acid or functional ingredients.
7. A food product according to claim 5 or claim 6 wherein the sweetener is sugar, sugar syrup or sugar substitutes such as maltitol, lactitol, mannitol, xylitol, sorbitol, or artificial sweeteners.
8. A food product according to claim 6 wherein the functional ingredients are minerals, vitamins or herbal extracts.
9. A food product according to claim 1 wherein the liquid centre has a viscosity varying from 0.89cP to 159000cP.
10. A food product according to claim 1 wherein the soft centre has a texture varying from a jelly to a fruit gum to a chew to a paste texture.

11. A food product according to claim 1 wherein the hard centre contains nut pieces, fruit pieces, cheese, chocolate or hard-boiled pieces.

12. A food product according to claim 1 wherein the particulate centre contains sherbert, popping candy, sugar /sugar-substitutes such as maltitol, lactitol, mannitol, xylitol, sorbitol, or artificial sweeteners, together with colour, flavour, acid or functional ingredients.

13. A food product according to claim 1 wherein the weight ratio of the casing to the centre is from 90:10 to 10 :90.

14. A food product according to claim 1 wherein the diameter is from 4mm to 50 mm.

15. A process for the production of a food product comprising a gelatin-free water-based hydrocolloid casing enclosing a hard, liquid soft or particulate centre which comprises partially setting a liquid hydrocolloid mass to form the casing and injecting with a hard, liquid or soft or powder centre and finally completing the setting of the hydrocolloid mass.

16. A process according to claim 15 wherein the casing is formed in two halves or as a balloon and filled with a hard, liquid, soft or powder centre.

17. A process according to claim 15 wherein the injection of the liquid or soft centre is carried out by means of a syringe or by one-shot depositing.

18. A process according to claim 15 wherein for water-based hydrocolloid casings excepting alginates enclosing a liquid or soft centre, the food product is prepared by depositing a liquid hydrocolloid mass at a temperature above its setting temperature in a mould which is at a lower temperature than the liquid hydrocolloid mass, and injecting with a liquid or soft centre at a lower temperature than the hydrocolloid mass while the hydrocolloid mass is still soft and cooling until the hydrocolloid mass sets.

19. A process according to claim 18 wherein the injected centre having a lower temperature than the liquid hydrocolloid mass is at a temperature from 5°C to 50°C.

5 20. A process according to claim 18 wherein the injected centre having a lower temperature than the liquid hydrocolloid mass causes the hydrocolloid mass to set immediately on contact, thereby encasing the centre within the gel.

10 21. A process according to claim 15 wherein the liquid hydrocolloid is deposited into a bubble pack lining the mould or into pots which form the packaging.

15 22. A process according to claim 15 wherein for gelatin-free water-based hydrocolloid casings excepting alginates enclosing a hard or particulate centre, the food product is prepared by lining a mould with a liquid hydrocolloid mass at a temperature above its setting temperature, the mould being at a lower temperature than the liquid hydrocolloid mass, to form a shell open at one end, inserting the hard or particulate centre into the shell, and backing off with a layer of hydrocolloid casing.

20 23. A process according to claim 15 wherein for a water-based alginate casing, the food product is prepared by depositing a liquid alginate mass in an aqueous medium containing calcium ions to form a semi-set casing surrounding the liquid alginate mass, injecting with a liquid or soft centre and finally completing the setting of the alginate mass.

25 24. A process according to claim 23 wherein the liquid alginate mass is deposited into a mould submerged in the calcium bath, the mould having fine holes in the base which allows the aqueous medium to circulate around the mass thereby causing it to set.

30 25. A food product comprising two or more gelatin-free water-based hydrocolloid casings connected together each casing enclosing a solid, liquid, soft or particulate centre.

35 26. A food product according to claim 25 wherein the centres within the casings are the same or different.

27. A food product according to claim 25 wherein when the centres are different, they comprise materials which are reactive with one another, the reaction taking place when the casings are destroyed on consumption.

5

28. A food product according to claim 27 wherein the reaction includes the release of a gas.

29. A food product according to claim 28 wherein the gas is carbon dioxide.

10

30. A food product according to claim 27 where one centre comprises sodium bicarbonate and another centre comprises citric acid.

15

31. A food product according to claim 27 wherein, in addition to the reactive materials, at least one of the centres comprises a champagne concentrate.

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A23G3/00 A23G9/02 A23G9/00 A23G3/20

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A23G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 023 841 A (NESTLE SA) 2 August 2000 (2000-08-02)	1-13,15
Y	paragraphs '0008!', '0011!', '0020!'-'0026!; example 3	17-19,23
Y	US 1 711 750 A (CHRISTOPHER SCHOPPNER WILLIAM) 7 May 1929 (1929-05-07) cited in the application the whole document	17-19,23
A	PATENT ABSTRACTS OF JAPAN vol. 015, no. 150 (C-0824), 16 April 1991 (1991-04-16) & JP 03 027233 A (RHEON AUTOM MACH CO LTD), 5 February 1991 (1991-02-05) abstract	25,26



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

S document member of the same patent family

Date of the actual completion of the international search

22 January 2002

Date of mailing of the international search report

06/02/2002

Name and mailing address of the ISA
European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Guyon, R

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 209 536 A (DOGLIOTTI AMILCARE) 24 June 1980 (1980-06-24) figure ---	15
X	EP 0 515 864 A (HERSHEY FOODS CORP) 2 December 1992 (1992-12-02) claims 1,1,10,-,12; example 5 ---	1-7,10, 11
X	PATENT ABSTRACTS OF JAPAN vol. 007, no. 171 (C-178), 28 July 1983 (1983-07-28) - & JP 58 078542 A (FUMIHIKO MASUDA), 12 May 1983 (1983-05-12) abstract; figure 6 ---	1,15,16, 18,22
X	US 5 302 396 A (PHADKE DEEPAK S ET AL) 12 April 1994 (1994-04-12) ---	1,2
Y	the whole document ---	25-31
Y	US 5 985 341 A (W. AHLSCHEDE) 16 November 1999 (1999-11-16) column 1, line 32 - line 40 column 2, line 27 - line 59 ---	25-31
X	US 4 769 244 A (LAVIE LOUIS) 6 September 1988 (1988-09-06) the whole document ---	1,25-30
X	EP 0 476 696 A (MERRELL DOW PHARMA) 25 March 1992 (1992-03-25) claims 1-13; examples ---	1,2, 25-30
X	WO 93 22939 A (WRIGLEY W M JUN CO) 25 November 1993 (1993-11-25) page 9, paragraph 3 -page 10, paragraph 1; claims 110-13,41,46 ---	1-4,25
X	US 4 101 650 A (UMEZAWA HAMA O) 18 July 1978 (1978-07-18) claim 1; examples 1,2 ---	1,14, 25-29
X	WO 00 19836 A (NESTLE SA ;WHITEHOUSE ANDREW STEVE (GB); ONG MEI HORNG (GB)) 13 April 2000 (2000-04-13) page 5, line 13 -page 6, line 4; claims 1,10; figures ---	1
X	PATENT ABSTRACTS OF JAPAN vol. 1995, no. 09, 31 October 1995 (1995-10-31) - & JP 07 163301 A (MEIJI MILK PROD CO LTD), 27 June 1995 (1995-06-27) abstract ---	1-3,12

-/-

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/EP 01/11369

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,A	EP 1 104 652 A (NESTLE SA) 6 June 2001 (2001-06-06) the whole document	1,2

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1023841	A	02-08-2000	AU 1356300 A BR 0000185 A CN 1264546 A EP 1023841 A1 HU 0000338 A2 JP 2000217515 A NO 20000309 A PL 338100 A1 US 2002001665 A1	03-08-2000 22-05-2001 30-08-2000 02-08-2000 28-09-2000 08-08-2000 31-07-2000 31-07-2000 03-01-2002
US 1711750	A	07-05-1929	NONE	
JP 03027233	A	05-02-1991	JP 1757039 C JP 4045137 B	23-04-1993 23-07-1992
US 4209536	A	24-06-1980	IT 1117077 B AT 366893 B AT 678778 A AU 518543 B2 AU 3936978 A BE 870639 A1 CA 1107129 A1 CH 635983 A5 DD 139386 A5 DE 2800309 A1 FI 782797 A ,B, FR 2403746 A1 GB 1574396 A JP 1433087 C JP 54055746 A JP 62042566 B LU 80257 A1 NL 7809240 A NZ 188309 A SE 7809870 A	10-02-1986 10-05-1982 15-10-1981 08-10-1981 06-03-1980 15-01-1979 18-08-1981 13-05-1983 02-01-1980 22-03-1979 22-03-1979 20-04-1979 03-09-1980 07-04-1988 04-05-1979 09-09-1987 16-03-1979 23-03-1979 24-10-1980 22-03-1979
EP 0515864	A	02-12-1992	AT 130728 T AU 655462 B2 AU 1528392 A CA 2067595 A1 DE 69206322 D1 EP 0515864 A1 FI 921946 A JP 5227894 A MX 9202008 A1 NO 921708 A NZ 242548 A US 5607716 A ZA 9203120 A	15-12-1995 22-12-1994 05-11-1992 02-11-1992 11-01-1996 02-12-1992 02-11-1992 07-09-1993 01-12-1992 02-11-1992 27-07-1993 04-03-1997 27-01-1993
JP 58078542	A	12-05-1983	JP 1025542 B JP 1545027 C	18-05-1989 15-02-1990
US 5302396	A	12-04-1994	US 5437873 A AT 123939 T AU 639137 B2 AU 8452691 A CA 2051531 A1	01-08-1995 15-07-1995 15-07-1993 26-03-1992 22-03-1992

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 01/11369

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5302396	A	DE 69110592 D1 DE 69110592 T2 DK 476696 T3 EP 0476696 A1 ES 2076435 T3 GR 3016993 T3 IE 913311 A1 JP 7010744 A KR 184642 B1 NZ 239802 A	27-07-1995 21-12-1995 14-08-1995 25-03-1992 01-11-1995 30-11-1995 25-02-1992 13-01-1995 01-05-1999 27-09-1993
US 5985341	A	16-11-1999 DE 19544795 A1 AU 709367 B2 AU 1095397 A BR 9611846 A CA 2239540 A1 CZ 9801547 A3 WO 9719602 A1 EP 0776609 A1 JP 3066082 B2 JP 11502721 T NO 982316 A PL 326986 A1	05-06-1997 26-08-1999 19-06-1997 28-12-1999 05-06-1997 12-08-1998 05-06-1997 04-06-1997 17-07-2000 09-03-1999 21-07-1998 09-11-1998
US 4769244	A	06-09-1988 CH 667374 A5 AT 61914 T AU 599629 B2 AU 6866387 A CA 1287252 A1 CN 87100839 A DE 3768829 D1 EP 0233839 A1 JP 62186773 A NZ 219107 A ZA 8700670 A	14-10-1988 15-04-1991 26-07-1990 13-08-1987 06-08-1991 26-08-1987 02-05-1991 26-08-1987 15-08-1987 26-04-1990 28-10-1987
EP 0476696	A	25-03-1992 AT 123939 T AU 639137 B2 AU 8452691 A CA 2051531 A1 DE 69110592 D1 DE 69110592 T2 DK 476696 T3 EP 0476696 A1 ES 2076435 T3 GR 3016993 T3 IE 913311 A1 JP 7010744 A KR 184642 B1 NZ 239802 A US 5437873 A US 5302396 A	15-07-1995 15-07-1993 26-03-1992 22-03-1992 27-07-1995 21-12-1995 14-08-1995 25-03-1992 01-11-1995 30-11-1995 25-02-1992 13-01-1995 01-05-1999 27-09-1993 01-08-1995 12-04-1994
WO 9322939	A	25-11-1993 AU 4241893 A WO 9322939 A1	13-12-1993 25-11-1993
US 4101650	A	18-07-1978 NONE	

INTERNATIONAL SEARCH REPORT

Intenal Application No

Information on patent family members

PCT/EP 01/11369

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0019836	A	13-04-2000	GB 2342030 A	05-04-2000
			AU 6085399 A	26-04-2000
			BR 9914185 A	19-06-2001
			CN 1321071 T	07-11-2001
			CZ 20011185 A3	12-09-2001
			WO 0019836 A1	13-04-2000
			EP 1117304 A1	25-07-2001
			NO 20011539 A	26-03-2001
			US 2001036499 A1	01-11-2001
JP 07163301	A	27-06-1995	NONE	
EP 1104652	A	06-06-2001	AU 7195100 A	07-06-2001
			BR 0005700 A	31-07-2001
			CN 1298648 A	13-06-2001
			EP 1104652 A1	06-06-2001
			JP 2001178382 A	03-07-2001
			NO 20006025 A	05-06-2001
			PL 344212 A1	04-06-2001

